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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/771,249	02/03/2004	Hangjun Chen	436/7	2587

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EXAMINER	
LY, ANH VU H	

ART UNIT	PAPER NUMBER
2667	

DATE MAILED: 09/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/771,249	CHEN ET AL.	
	Examiner	Art Unit	
	Anh-Vu H Ly	2667	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-6,8-14,16-22,24-30 and 32 is/are rejected.

7)☒ Claim(s) 7,15,23 and 31 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 20040521.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-4, 8-12, 16-20, 24-28, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Tellado et al (US Patent No. 6,314,146 B1). Hereinafter, referred to as Tellado.

With respect to claims 1, 9, 17, and 25, Tellado discloses in Fig. 24 a transmitted OFDM clipped signal with maximum amplitudes of A and -A (db) (OFDM signal having been subject to a clipping function prior to transmission in order to reduce the peak to average power ratio). Tellado discloses (col. 27, line 40 – col. 28, line 57) that the receiver transforms the received distorted signal to provide the individual frequency domain components of the distorted signal (transforming a received OFDM signal from a transmission channel into the frequency domain). Tellado discloses in Fig. 29, a block diagram of a receiver for decoding the transmitted OFDM clipped signal (recovering data symbols from the transformed OFDM signal, which including clipping noise). The receiver decodes the individual frequency domain components of the received distorted signal to generate a first estimate of the original signal. Obvious, the first estimate of the original signal will contain errors due to the distortion (estimating the clipping noise in the frequency domain based on the data symbols). The first estimate of the distortion is extracted (clipping noise) and combined (subtracting algorithm performed) with the received signal (subtracting the estimated clipping noise from the transformed OFDM signal).

With respect to claims 2, 18, and 26, Tellado discloses (col. 31, lines 61-67) that as few as two iterations (repeating steps a-d more than one time in order to iteratively cancel the clipping noise) of the estimation process has shown to provide satisfactory symbol error rates for multi-carrier systems.

With respect to claims 3-4, 11-12, 19-20, and 27-28, Tellado discloses (col. 31, lines 61-67) that two to five iterations are sufficient to provide error rates in a multi-carrier signal (steps a-d are repeated only two and/or three times).

With respect to claim 10, Tellado discloses in Fig. 29, a block diagram of a receiver for decoding the transmitted OFDM clipped signal (wherein the receiver, the decoding unit, the noise estimator, and the difference circuit operate iteratively in order to cancel the clipping noise).

With respect to claims 8, 16, 24, and 32, Tellado discloses (col. 28, lines 38-43) that clipping is one particular type of distortion that has been found to satisfactorily reduce the PAR (peak to average ratio) of a signal. A signal may be clipped, which reduces the PAR of a signal, and the clipped portions of the signal discarded. The clipped portions may then be estimated by the received in an attempt to reconstruct the original signal (wherein clipping function is one of a deliberate clipping algorithm and a repeated clipping algorithm).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 5-6, 13-14, 21-22, and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tellado et al (US Patent No. 6,314,146 B1).

With respect to claims 5, 13, 21, and 29, Tellado discloses in Fig. 13, a receiver includes a FFT 302, a demodulator 304 (de-mapping the transformed OFDM signal), and a decoder 306 (de-coding the received signal). Tellado does not disclose de-interleaving the de-mapped signal, decoding the de-interleaved signal, interleaving the decoded signal, and mapping the interleaved signal to obtain the data symbols. However, techniques such as interleaving and de-interleaving are well known in the art to reduce the transmitted error rates. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include above stated features in Tellado's system, to reduce the transmitted error rates.

With respect to claims 6, 14, 22, and 30, Tellado discloses in Fig. 29 that the decoded symbol data outputted from the decoder 846 are fed to the IFFT 856 and distorter 858. Herein, the distorter 858 distorts the signal as same as the distorter 838 in the transmitter 830 (Fig. 28A) (subjecting the data symbols to substantially the same clipping function to which the OFDM signal had been subject to prior to transmission). FFT 860 produces C^(X(q), A) (attenuating the data symbols). C^(X(q), A) is then fed into the input of the decoder 846 (subtracting the attenuated data symbols from the clipped data symbols to obtain the estimated clipping noise).

Allowable Subject Matter

3. Claims 7, 15, 23, and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Barak et al (US Pub 2004/0076247 A1) discloses peak to average power radio modifier.

Fifield (US Patent No. 6,781,951 B1) discloses radio communication system.

Tellado et al (US Patent No. 6,512,797 B1) discloses peak to average power ratio reduction.

Corral (US Pub 2004/0086054 A1) discloses method and apparatus for reducing a peak to average power ratio in an OFDM signal.

Awater et al (US Patent No. 6,175,551 B1) discloses transmission system and method employing peak cancellation to reduce the peak to average power ratio.

Jafarkhani et al (US Patent No. 6,445,747 B1) discloses method and apparatus to reduce peak to average power ratio in multi-carrier modulation.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh-Vu H Ly whose telephone number is 571-272-3175. The examiner can normally be reached on Monday-Friday 7:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

avl

CHI PHAM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600 9/13/07